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Route To:

Subject: Bark Beetle Activity in Recreation Sites on the Black Mesa RD, Apache-Sitgreaves NFs (blackmesard)

To: District Ranger, Black Mesa RD

I was requested to assess bark beetle activity in developed recreation sites on the Black Mesa RD, Apache-Sitgreaves NFs. On September 29–October 1, 2004, I traveled to the Districts to evaluate and discuss prevention and suppression projects in recreation sites with District staff (Gayle Richardson, Black Mesa RD). I describe in this report what bark beetle activity was observed in these areas, summarize the effectiveness of the preventive spray project, and make recommendations to minimize bark beetle impacts in the future.

Bark beetle activity on the Apache-Sitgreaves NFs

A detailed summary of the aerial detection survey results will be provided to the Forest at a later date; however, our preliminary analysis showed that ponderosa pine mortality has decreased in 2004 compared with 2002 and 2003. This trend of decreased bark beetle activity is similar to what has been observed in the majority of Arizona during 2004. Nonetheless, there are still areas that are experiencing considerable pine mortality and the population of bark beetles is still relatively high throughout the District.

Inspection of fading trees and collected specimens determined that *Ips* beetles (*Ips pini*, *I. lecontei*, and *I. calligraphus*) were the primary cause of ponderosa pine mortality on the Black Mesa RD. *Ips pini* (the pine engraver beetle) is widespread throughout the West and can occasionally reach outbreak proportions (Kegley, et al., 1997). *Ips lecontei* (Arizona 5-spined ips) populations have increased and are killing trees in and around the Rodeo-Chediski Fire and throughout much of the District. This *Ips* species has historically been considered an aggressive ponderosa pine killer below the Mogollon Rim (Massey and Parker, 1981; Parker, 1991) and has caused extensive tree mortality on the Prescott and Tonto NF's over the previous three years. Several of the larger-diameter pine with tops infested by *Ips* also have western pine beetle (*Dendroctonus brevicomis*) in the lower portion of the trunks. Populations of this bark beetle increased throughout much of Arizona in 2003. Other bark beetles species are present in ponderosa pine forests across the Forest, but are not considered tree killers (i.e., red turpentine beetle (*D. valens*)) or are at very low populations (i.e., other *Ips* species and roundheaded pine beetle (*D. adjunctus*)).

Bark beetle activity in developed recreation sites

Trees growing in developed recreation sites are often stressed due to repeated damage caused by campers and soil compaction caused by roads and large vehicles parked off-road. During periods of drought or below-average precipitation, such has been occurring over the last few years, these trees can become extremely stressed. This is further exacerbated by the relatively high density of ponderosa pine growing in several of the campgrounds. When trees are growing at high densities, there is a greater amount of inter-tree competition for limited resources such as light, water, and nutrients (Kolb, et al., 1998). The combined effect of these factors is lower production of defensive compounds by the trees and, consequently, increased susceptibility to bark beetle attack. Bark beetles may also prefer these dense stands, as compared to more open stands, due to microclimate differences (Amman and Logan, 1998).

From September 29 through October 1, 2004, I examined nearly all developed recreation and administrative sites on the Black Mesa RD. I conducted a similar survey of these same sites the last two falls (site visit reports dated October 22, 2002 and October 3, 2003). My surveys of the recreation sites consisted of quick walkthroughs looking for fading trees, pitch tubes, and boring dust. It is important to note that a more intensive survey may find additional infested trees and additional trees may have become infested after my survey was completed. Therefore, the numbers of infested trees reported here should not be considered absolute. In general, bark beetle activity has remained high within the lower elevation sites such as near the Black Mesa District Office and towns of Heber and Overgaard. Bark beetle activity at recreation sites in other parts of the Districts appeared to be similar to 2003 or slightly lower. A brief summary is provided for each site.

Many recreation sites on the District are comprised of densely stocked ponderosa pine stands. Pines in many of the campgrounds have high levels of dwarf mistletoe infection. Thinning projects are planned for 3 of the recreation sites: Sinkhole CG, Canyon Point CG, and Black Canyon Rim CG. The prescription will be: removing trees less than 6 inches dbh while maintaining a 10 ft. by 10 ft. spacing, plus remove all dead and dying pine less than 9 inches dbh. When selecting trees for thinning, attention should be paid to dwarf mistletoe-infected trees. Forested areas within the District Office Campground are also scheduled for thinning treatments during FY2005.

Black Mesa District Office – Fifteen current infested and two previously infested (attacked late 2003 or early 2004) were seen within the immediate area of the compound. Additional trees that had been attacked by bark beetles in 2004 were felled at the end of the summer and tops were being burned on September 30th. Other areas of bark beetle activity were observed just outside the compound area; for example, forested areas between the compound and the Tall Timbers Park contained approximately 12 infested or previously infested pine trees.

Camp Shadow Pines – Three current infested and four previously infested (attacked late 2003 or early 2004) were seen within the area of the Camp. Additional mortality was noted behind the sport fields.

Black Mesa Work Center – One current infested pine was seen between the work center and Highway 260.

Canyon Point Campground, Large Group Area, and Small Group Area – Forty-six current infested and approximately 330 previously infested (attacked late 2003 or early 2004) were seen within the recreation area and immediately adjacent. The planned thinning and dead and dying removal treatments will greatly improve conditions in this recreation site.

Rim Campground – Two currently infested and one previously infested were observed within the vicinity of this recreation site. The thinning and dead and dying removal treatments greatly improved conditions in this recreation site.

Sinkhole Campground – Thirty-two trees were attacked within the immediate vicinity of this recreation site (***Figure 1***). Additional trees less than 9 inches DBH that had been infested were chipped on site.

Figure 1. *Ponderosa pine attacked by bark beetles within the Sinkhole Campground, Black Mesa RD.*

Woods Canyon Group Area – No current infested and 16 previously infested pines were observed at this recreation site.

Aspen Campground – Fourteen current infested and approximately 380 previously infested (attacked late 2003 or early 2004) were seen within the immediate area or directly adjacent to this recreation site. Most of the larger trees killed by bark beetles in late 2003 were removed during the spring of 2004.

Crook Campground – One current infested ponderosa pine was seen within the immediate area of the compound this recreation site. Additional mortality was noted in adjacent areas.

Mogollon Campground – Only one ponderosa pine attacked in early 2004 was observed at this recreation site. Additional pine mortality was seen approximately 200 feet outside the campground

Spillway Campground, Spillway Group Area and Amphitheater – No new pine mortality was observed within this recreation site.

Rim Visitor Center – One current infested and two previously infested (attacked late 2003 or early 2004) were seen within the immediate area of the Visitor Center area. This area was severely impacted by *Ips lecontei* in the fall of 2003.

Black Canyon Rim Campground – Nine small-diameter pines were currently infested and an additional 80 small-diameter pines had been previously infested at this recreation site. The scheduled thinning of small-diameter pine around the larger trees will improve the vigor of the remaining trees.

Effectiveness of preventative sprays for bark beetles in recreation sites

I describe here the effectiveness of the 2004 spray project. Trees were sprayed with Sevin SL at eleven recreation and administrative sites across the Black Mesa District during April and early May of 2004. Only 1 tree out of more than 2,641 trees sprayed was successfully attacked by bark beetles despite heavy beetle pressure in many of the areas treated. Therefore, the spray treatment seems to continue to be very effective at preventing bark beetles from successfully attacking these high value trees.

Recommendations

Because the current beetle infestation is occurring on the landscape scale and is largely a result of the ongoing drought, it is essentially impossible to control the beetle population as a whole through management actions. Therefore, control actions should be limited to the most critical, high-value areas that have adequate accessibility.

Based on the current weather and stand conditions, setting, and large population of bark beetles within the immediate area, trees within many of the campgrounds continue to be highly susceptible to beetle attack. Therefore, a combination of removal of infested trees, application of preventive insecticide sprays, and thinning is recommended for many of the sites.

In the short-term, prompt removal of currently infested trees will help to reduce the immediate local population of beetles. However, because these insects are very common, removal of infested trees is not a guarantee of protection. Therefore, this approach is generally recommended in combination with the long-term preventive approaches of thinning and in the short-term preventative spraying while beetle populations remain high. It is recommended that the infested trees be removed yet this fall before the brood completes their development and adult beetles emerge. Felling of infested trees will not kill developing brood; infested trees must either be removed from the site or treated on site.

The thinning prescription for removing the smaller-diameter trees at three of the sites on the Black Mesa RD and treatment of dead and dying at other sites will improve the growing conditions for the residual trees and help to lower the local population of beetles. When carrying out this thinning prescription, careful management of the slash should be considered while populations are high. Removal of thinning slash from the recreation areas is the best option. If treated on-site, burning, chipping, or burying green will help to reduce the potential for an additional population increase of beetles. It is recommended that the infested trees be removed or treated before early spring (i.e., by April 1st), which is prior to the brood completing their development and adult beetles emerge.

Funds may be available for FY2005 from Forest Health Protection to manage bark beetle activity. Requests for these funds should be in no later than October 15, 2004.

If you have any questions regarding my assessment of current bark beetle activities within the project area, its potential effect on residual standing trees, or my recommendations, please let me know. I can be reached at (928) 556-2074.

/s/ Joel D. Mcmillin
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cc: Mailroom R3 Apache Sitgreaves, Deb Bumpus, Gayle Richardson, John Anhold, Leonard Lucero, Debra Allen-Reid, Kathleen Klein

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